

**REMARKS**

In response to Office Action dated June 9, 2007 and in view of Applicant's election of Species I, the following claims encompassing the elected invention are prosecuted: 1-3, 6, 8-18, 21, 25 and 39.

The addition of new Claims 43-47 are encompassed within the Species I elected invention.

To clarify the record, the Examiner has indicated that in the election Applicant argued that the limitation in Claim 12 renders that claim patentable and the claim reads on all embodiments in the specification. The particular limitation expressed was that the magnets have a first magnetic pole "facing toward" the equilibrium location. The limitation clearly refers to an orientation in which the magnetic poles are facing upward, as opposed to downward away from the equilibrium location. The term "facing toward" does not mean directly oriented at the center of the equilibrium location which apparently is the interpretation given by the Examiner. In the specification, at paragraph [0020], it states:

In the embodiment illustrated in Figure 1, magnets 14 and 16 are all polarized in the same direction, which is parallel to the z axis. Figure 1A shows schematically an alternative embodiment of the invention wherein each of magnets 14 are inclined toward the z axis at an angle,  $\phi_1$ , and each of the magnets 16 are inclined toward the z axis at an angle,  $\phi_2$ .

It is thus apparent that when describing the Figure 1A configuration the language with respect to orientation of the magnets states that they are "inclined toward the z axis" whereas in the embodiment illustrated in Figure 1, it merely states that the magnets 14 and

16 are all "polarized in the same direction." The language in the claim that the magnetic pole is "facing toward" the equilibrium location is thus consistent with the language in Figure 1, and is not limited to the orientation in Figure 1A. It is respectfully suggested that the Examiner is in error with respect to the breadth of Claim 12; it clearly reads on all of the embodiments described and illustrated in Figure 1. However, Applicant wishes to make clear that the invention is not limited to configurations in which all of the static field magnets are oriented in the same direction.

With respect to the drawing objection, the Examiner states that the drawing must show every feature of the invention specified in the claims. Applicant certainly agrees. The Examiner goes on to state that "[t]herefore, the width W1 (claim 18) must be shown or the feature(s) canceled from the claim(s)." The Examiner has overlooked the specific showing in Figure 7 of the width W1. It is therefore clear that this dimension has been identified in the specification and the drawings. It is therefore requested that the Examiner withdraw the objection to the drawings.

The Examiner has rejected all of the elected claims, other than Claim 25, based on Whitehead 5,168,183. The elected claims include two independent Claims, 1 and 39. Claim 1 has now been modified in several respects. First, the minimum number of magnets that generate the static magnetic field has been changed from 2 to 3. Three magnets of course define a plane in standard Euclidean geometry. This structural change clearly distinguishes the Whitehead disclosure and teachings as there are not three magnets that are in a common plane in Whitehead. Specifically, Whitehead discloses that the magnets 18, 20 are in a first plane and magnets 14, 16 are in a second plane. Thus, the magnets that define the static magnetic field in Whitehead although showing four magnets, does not

show three magnets in a common plane. It is one of the advantageous features of the embodiments of the invention disclosed by applicant that positioning three magnets in a common plane will permit the closer packing of the magnets resulting in a smaller and more unobtrusive base. Furthermore, under certain conditions the use of three magnets in a single plane will create an improved static magnetic field for levitating an object. Finally, although the claim is not limited to three magnets, it includes configurations in which only three magnets are used to create the static magnetic field whereas three magnets cannot be used by Whitehead based on its disclosure and teachings.

Claim 1 has also been amended so as to define that the magnetic element (the "float") is located above the plane defined by the at least three magnets. This clarifies that the embodiments of the invention will levitate the element completely from below and is thus distinct from configurations such as that shown in Bosley 4,585,282 which requires magnets above and below the levitating element or at least the sensors must be placed below the levitating element if the electromagnet for controlling the position of the levitating element is above the element.

Claim 1 has further been modified so as to specify that the magnetic field defines an "elongated equilibrium location" and then describes the restoring force when the element is displaced from the equilibrium location along one of two axes. The specification does not expressly state that the equilibrium location may be elongated, but by physical arrangement of the static field magnets, by providing magnets with different strength, or by a combination of a ring magnet and other static field magnets the shape can be controlled. Maintaining the terminology of the prior claims and specification, Applicant describes the unstable axis but references it relative to the longitudinal axis of the elongated equilibrium location, stating

that it is substantially orthogonal thereto. Similarly, displacements in the direction along the longitudinal axis of the elongated equilibrium location are explained with that reference system.

Based on these amendments to Claim 1, and the now clear distinction between the invention set forth in Claim 1 and the device disclosed and shown in the Whitehead patent, it is clear that Claim 1 is patentable over the Whitehead disclosure and teachings and it is respectfully requested that the Section 102 rejection based on Whitehead be withdrawn and Claim 1 indicated as allowable.

Claim 6 has been amended so as to specify that the coils of the electromagnet are not merely coplanar with one another, but are coplanar with the three magnets that define the static magnetic field as now set forth in Claim 1. Claim 8 has been amended so as to be consistent with the minimum number of magnets set forth in Claim 1 from which it depends. Claim 10 has been amended so as to redefine the references for the unstable and stable axes of the elongated magnetic field. Claim 13 has been modified to clarify the reference of the first magnetic poles of the four magnets defined in earlier dependent claims. Claim 15 has been modified for consistency with the minimum number of magnets now set forth in Claim 1. It is therefore submitted that Claim 1 and all of the claims dependent thereon are patentable over the Whitehead disclosure and teachings and the claims are allowable and the same is respectfully requested.

Claim 39, the other independent claim at issue at the time of the Office Action has been amended with respect to the first two limitations discussed above with regard to Claim 1. Specifically the claim has been modified so as to specify that there is at least three magnets defining a plane arranged to generate the static magnetic field and that the

magnetic element is located above the plane. Claim 39 incorporates the limitation set forth in dependent claim 10 (on Claim 1) and is additionally patentable over the Whitehead disclosure and teachings for the reasons expressed above with regard to Claim 1.

The Examiner has also rejected Claims 15 - 18 under 35 U.S.C. § 103(a) as unpatentable over Whitehead in view of Bosley. As noted above, Bosley describes a system and method for levitating an object which requires either the force producing components or at least one force creating component and a sensor for modifying the restoring force of an electromagnet. It therefore describes a magnetic levitating system that is of an entirely different nature than the system and method described and claimed in the instant application. Furthermore, Claims 15 - 18 are dependent on Claim 1, which is now patentably distinct from the Whitehead disclosure and teachings. The disclosure in Bosley makes no contribution to the disclosure in Whitehead because the system and methods are of entirely different types. Bosley does not teach the use of three magnets defining a plane that is **below** the plane in which the magnetic element floats.

Applicant has added Claims 43 and 44 which are dependent on Claim 39. Claim 43 specifies that the magnets are smaller in size than the shortest distance between the magnets. (Specification at [0019]) This is also disclosed in Figure 1 of the application. Moreover, it clearly distinguishes the claim, in addition to the distinctions set forth in amended Claim 1, since the magnets in Whitehead are of the bar type and overlap one another so that even if they were in the same plane, which they clearly are not, they are not smaller in size than the shortest distance between the magnets. The shortest distance would appear to be the distance  $D_x$  and obviously the size of bar magnets 14, 16, 18 and 20 are greater than distance  $D_x$ . Furthermore, in Claim 44, the Whitehead disclosure and

teaching are again avoided by specifying that the controllable force is located in the same plane as the three coplanar static field magnets. In Whitehead, the controllable force is provided by the "split coil 22" (See Fig. 5) which is clearly in a separate and distinct plane from the two planes of the static field magnets 14, 16 and 18, 20.

Applicant has added Claim 45 to fully claim the scope of the invention. Claim 45 recites "at least one magnet" for the simple reason that a magnet can be shaped either physically or through variable magnetization so as to generate a static magnetic field which defines an oblong potential equilibrium location. As in Claim 1, defining the potential energy equilibrium location as having a specific plane geometry shape -- oblong, in Claim 45, or elongated in Claim 1 -- assists in more responsive application of a stabilizing force because the field is narrower along the unstable axis than along the stable axis. Whitehead does not disclose or teach a specific shape of a potential energy equilibrium location. Claim 45 by specifying that at least a single magnet can be used to create the oblong potential equilibrium location obviously differs physically from the various configurations shown in, for example, Fig. 1 or Fig. 4. The claim emphasizes that what is important in the invention is the shape and/or size of the static magnetic field, rather than the physical magnets that produce that field. While there are advantages to utilizing multiple magnets to create an elongated or oblong static magnetic field, it may also be accomplished with a single static field magnet if it is properly shaped or magnetized. The Whitehead Figure 11 configuration shows a single magnet 100 creating the static magnetic field but it is apparent from Figure 10 which illustrates that the magnet 100 is perfectly circular that the static magnetic field cannot be "oblong." Thus, Whitehead is clearly distinct and the claim is patentable over Whitehead on that basis.

Claims 46 and 47 are dependent on Claim 45 and further distinguish the Whitehead disclosure and teachings by specifying that the at least one magnet has an oblong shape, clearly not shown in Whitehead, and in Claim 47 that the at least one magnet is cylindrical or a ring magnet but that there are additional magnets the composite magnetic field of which creates an elongated shape equilibrium location. That further distinguishes the Whitehead reference.

Applicant points out that there is a co-pending application filed by Janick Simeray in the United States and elsewhere which includes embodiments such as that shown in Figures 7, 9 and 10 which show ring magnets, the magnetic field of which is altered by the presence of additional magnets, for example, 71, 72, and magnets 81, 82 as seen in Figure 9. Claim 45 is specifically intended to read directly on the Simeray devices shown in Figures 7, 9 and 10 although other claims of the instant application also read on the various configurations disclosed in the Simeray patent.

For the above reasons, and the amendments to the claims as identified above, it is submitted that all of the claims are distinguishable from the prior art relied upon by the Examiner, that the objection to the drawing was in error, and with the explanation relating to the restriction requirement, all the claims are in form and condition for allowance and the same is respectfully requested.

Dated this 27th day of July, 2007.

Respectfully submitted,

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